

COMMUNICATION AND NETWORKING RISER ECR FORM

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ECR# (assigned internally): #005

Name of Originator: Brad Barmore

Company Name: Intel Corporation

Originator Contact Information:

Phone: (503) 696-4393

e-mail: brad.barmore@intel.com

Title of the Change: CDC_DN_ENAB# pull-up resistor change

Specification Title and Version: CNR Specification, Version 1.0

Reason for Change:

As designs supporting the CDC_DN_ENAB# functionality have been developed, it has become apparent that there is a slight flaw in the CNR Specification. This flaw occurs when there is no codec down, and a CNR is installed which does not master the AC '97 Interface (CDC_DN_ENAB# does not have a 1K pull-up resistor. In this case, the CDC_DN_ENAB# pin is floating, which in turn causes the BIOS algorithms to fail.

Description of Change:

The change consists of adding a weak pull-up (changing the value of R_B from 1Kohm to 100kohm, in the case when a CNR card is not designed to master the AC '97 Interface) on the CNR to the CDC_DN_ENAB# signal and further specifying the maximum leakage current into any digital input (attached to the CDC_DN_ENAB# signal). This implies that changes will be required to Section 3.3.1.2 and Section 3.4. The exact changes to the specification are outlined below (changes are in red).

3.3.1.2 CDC_DN_ENAB# Implementation Models

As mentioned in Section 3.2.1, the CDC_DN_ENAB# signal is used to indicate which device (motherboard or CNR) is controlling the AC '97 Interface. In other words, CDC_DN_ENAB# indicates where the primary codec resides. Both the CNR and the motherboard are responsible for monitoring the state of the CDC_DN_ENAB# signal, and responding to its state in a proper manner. Figure shows a conceptual view of the circuitry required in implementing the CDC_DN_ENAB# signal, with a single codec motherboard and a dual codec CNR.

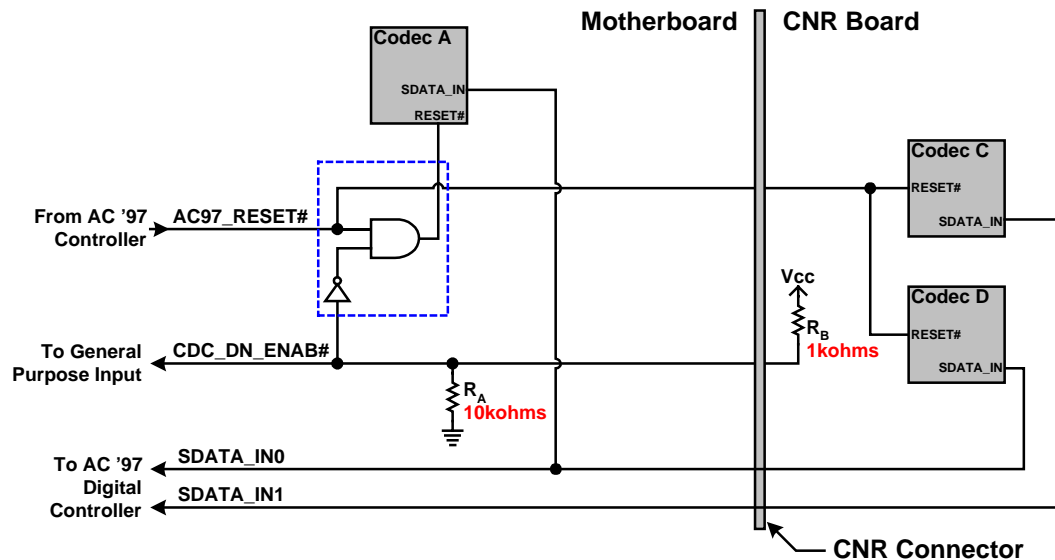


Figure 11 – CDC_DN_ENAB# support circuitry for a single codec motherboard

As shown in Figure 11, when a single codec is located on the motherboard, the resistor R_A and the circuitry (AND and NOT gates) shown inside the dashed box must be implemented, on the motherboard. This circuitry is required in order to disable the motherboard codec when a CNR is installed which contains two AC '97 codecs (or a single AC '97 codec which must be the primary codec on the AC-Link). In addition, the AC '97 codec on both the motherboard and the CNR must be compliant with all of the latest Engineering Change Notices (ECN) and specification updates for the AC '97 specification.

By installing resistor R_B (1kohm) on the CNR, the codec on the motherboard becomes disabled (held in reset) and the codec(s) on the CNR take control of the AC-Link. One possible example of using this architecture is a system integrator installing an audio plus modem CNR in a system already containing an audio codec on the motherboard. The audio codec on the motherboard would then be disabled, allowing all of the codecs on the CNR to be used.

The architecture shown in Figure 12 has some unique features. These include the possibility of the CNR being used as an upgrade to the existing audio features of the motherboard (by simply not installing changing the value of resistor R_B on the CNR to 100kohms). An example of one such upgrade is increasing from two-channel to four or six-channel audio (see Section 6.3.2 for more information on multi-channel audio upgrading).

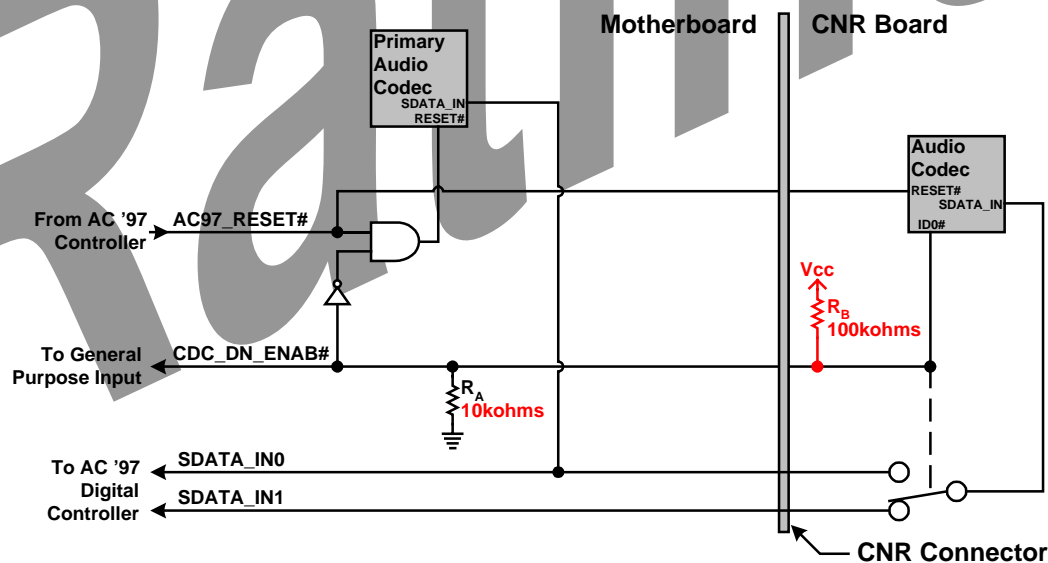


Figure 12 – CDC_DN_ENAB# support circuitry for multi-channel audio upgrade

Figure 13 shows the circuitry required on the motherboard to support a two-codec down (two codecs on the motherboard) configuration. This circuitry disables the codec on a single codec CNR-with-a-single-codec. Notice

Note: All CNR designs must include resistor R_B . The value of R_B must be either 1kohm or 100kohm, depending on the intended functionality of the CNR.

Signal Name	Min.	Max.	Units	Comments
CDC_DN_ENAB#				
Pull-up resistance	950	1050	ohms	Value of R _B for CNR controlling the AC '97 Interface
Pull-up resistance	95000	105000	ohms	Value of R _B for CNR not controlling the AC '97 Interface
Pull-down resistance	9500	10500	ohms	Value of R _A for Motherboard
V _{IL}		0.3xV _{DD}	Volts	<u>V_{DD} refers to the digital supply operating the circuitry on the CNR board, which interfaces to the specified signal (i.e. 3.3VD).</u>
V _{IH}	0.5xV _{DD}		Volts	
Leakage Current	-45	-45	µAmps	Maximum combined leakage current allowed for all digital pins connected to CDC_DN_ENAB# (excludes R _A and R _B)